AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1.   (Canceled)

2.   (Previously presented) The method of claim 6, wherein the rule matching the source and destination ports of the received packet comprises a highest priority matching rule.

3.   (Previously presented) The method of claim 6, wherein:

the source port range of each rule is specified by a source port lower bound and a source

       port upper bound;

and the destination port range of each rule is specified by a destination port lower bound

       and a destination port upper bound.

4.   (Original) The method of claim 3, wherein:

the source port of the received packet is within the source port range of a rule if the

       packet's source port is greater than or equal to the source port lower bound of the

       rule and less than or equal to the source port upper bound of the rule; and

the destination port of the received packet is within the destination port range of the rule

       if the packet's destination port is greater than or equal to the destination port

lower bound of the rule and less than or equal to the destination port upper bound

of the rule.

5.   (Previously presented) The method of claim 6, wherein identifying a bin

corresponding to a network path and a protocol of a received packet comprises:

identifying, from a number of entries in a data structure, an entry having a source address

prefix matching a source address of the received packet, the matching entry

including a first identifier;

identifying, from a number of entries in another data structure, an entry having a

destination address prefix matching a destination address of the received packet,

the matching entry including a second identifier; and

identifying, from the number of bins, a bin corresponding to the first and second

identifiers and the protocol.

6.   (Previously presented) A method comprising,

providing a plurality of bins stored in a memory, each of the bins including a number of

rules, each rule specifying a source port range and a destination port range;

identifying, from the plurality of bins, a bin corresponding to a network path and a

protocol of a received packet;

comparing a source port and a destination port of the received packet with the rules of the

corresponding bin; and

if the source port of the received packet is within the source port range of a rule and the

destination port of the received packet is within the destination port range of the

rule, applying an action associated with the rule to the received packet;

wherein identifying a bin corresponding to a network path and a protocol of a received

packet comprises:

searching a source address data structure to find a first index and a third index, the

first index associated with a fully specified filter having a source prefix

matching the source address of the packet, the third index associated with

a partially specified filter having a source prefix matching the source

address of the packet;

searching a destination address data structure to find a second index and a fourth

index, the second index associated with a fully specified filter having a

destination prefix matching the destination address of the packet, the

fourth index associated with a partially specified filter having a destination

prefix matching the destination address of the packet;

forming a key from the first index, the second index, and the protocol; and

searching a primary table for an entry matching the key, the primary table

including a number of entries, each entry corresponding to one of a fully

specified filter, a fully specified filter intersection, and an indicator filter;

wherein an entry of the primary table matching the key will identify the

corresponding bin.

7.   (Original) The method of claim 6, further comprising:

searching a first of two secondary tables for an entry matching a key formed from the

third index and the protocol, the first secondary table including a number of

entries, each entry corresponding to a partially specified filter; and

searching a second of the two secondary tables for an entry matching a key formed from

the fourth index and the protocol, the second secondary table including a number

of entries, each entry corresponding to a partially specified filter;

wherein, if no match is found in the primary table, a matching entry in one of the two

secondary tables will identify the corresponding bin.

8.   (Original) The method of claim 7, wherein, if no match is found in the

primary table or either of the secondary tables, the corresponding bin comprises a default

bin associated with an entire two-dimensional address space.

9.   (Original) The method of claim 6, further comprising:

searching the source address data structure to find a fifth index associated with a wide

filter having a source prefix matching the source address of the packet;

searching the destination address data structure to find a sixth index associated with a

wide filter having a destination prefix matching the destination address of the

packet;

forming a second key from the fifth index, the sixth index, and the protocol; and

searching a wide filter table for an entry matching the second key, the wide filter table

including a number of entries, each entry corresponding to a wide filter;

wherein, if no match is found in the primary table, a matching entry the wide filter table

will identify the corresponding bin.

10.   (Original) The method of claim 9, wherein each wide filter contained in

the wide filter table comprises a fully specified filter having a number of indicator filters

exceeding a specified threshold.

11.   (Canceled)

12.   (Previously presented) The method of claim 18, wherein the matching rule

comprises a highest priority matching rule.

13.   (Previously presented) The method of claim 18, wherein the at least one

transport level field of the received packet comprises a source port and a destination port.

14.   (Original) The method of claim 13, wherein each rule of a bin includes a

source port lower bound, a source port upper bound, a destination port lower bound, and

a destination port upper bound.

15.   (Original) The method of claim 14, wherein a rule matches the at least one

transport level field of the packet if:

the source port of the received packet is greater than or equal to the source port

lower bound of the rule and less than or equal to the source port upper bound of the rule;

and

the destination port of the received packet is greater than or equal to the

destination port lower bound of the rule and less than or equal to the destination port

upper bound of the rule.

16.   (Canceled)

17.   (Previously presented) The method of claim 18, wherein identifying a bin

corresponding to a network path of a received packet comprises:

identifying, from a number of entries in a data structure, an entry having a source address

prefix matching the source address of the received packet, the matching entry including a

first identifier;

identifying, from a number of entries in another data structure, an entry having a

destination address prefix matching the destination address of the received packet, the

matching entry including a second identifier; and

identifying, from the number of bins, a bin corresponding to the first and second

identifiers and the protocol.

18.   (Previously presented) A method comprising:

identifying, from a plurality of bins stored in a memory, a bin corresponding to a network

        path of a received packet, each of the bins including a number of rules, the

corresponding bin further corresponding to a protocol associated with the received

packet;

issuing a command to a classification circuit, the command identifying the corresponding

bin;

copying the rules of the corresponding bin from the memory to the classification circuit,

wherein the classification circuit compares at least one transport level field of the

received packet with each of the rules and provides a match signal if a rule

matches the at least one transport level field of the packet; and

in response to the match signal, applying an action associated with the matching rule to

the received packet, wherein identifying a bin corresponding to a network path of

a received packet comprises:

searching a source address data structure to find a first index and a third index, the

first index associated with a fully specified filter having a source prefix

matching the source address of the packet, the third index associated with

a partially specified filter having a source prefix matching the source

address of the packet;

searching a destination address data structure to find a second index and a fourth

index, the second index associated with a fully specified filter having a

destination prefix matching the destination address of the packet, the

fourth index associated with a partially specified filter having a destination

prefix matching the destination address of the packet;

forming a key from the first index, the second index, and the protocol; and

searching a primary table for an entry matching the key, the primary table

including a number of entries, each entry corresponding to one of a fully

specified filter, a fully specified filter intersection, and an indicator filter;

and

wherein an entry of the primary table matching the key will identify the

corresponding bin.

19.   (Original) The method of claim 18, further comprising:

searching a first of two secondary tables for an entry matching a key formed from the

third index and the protocol, the first secondary table including a number of

entries, each entry corresponding to a partially specified filter; and

searching a second of the two secondary tables for an entry matching a key formed from

the fourth index and the protocol, the second secondary table including a number

of entries, each entry corresponding to a partially specified filter;

wherein, if no match is found in the primary table, a matching entry in one of the two

secondary tables will identify the corresponding bin.

20.   (Original) The method of claim 19, wherein, if no match is found in the

primary table or either of the secondary tables, the corresponding bin comprises a default

bin associated with an entire two-dimensional address space.

21.   (Original) The method of claim 18, further comprising:

searching the source address data structure to find a fifth index associated with a wide

filter having a source prefix matching the source address of the packet;

searching the destination address data structure to find a sixth index associated with a

wide filter having a destination prefix matching the destination address of the

packet;

forming a second key from the fifth index, the sixth index, and the protocol; and

searching a wide filter table for an entry matching the second key, the wide filter table

including a number of entries, each entry corresponding to a wide filter;

wherein, if no match is found in the primary table, a matching entry the wide filter table

will identify the corresponding bin.

22.   (Original) The method of claim 21, wherein each wide filter contained in
the wide filter table comprises a fully specified filter having a number of indicator filters
exceeding a specified threshold.

23.   (Canceled)

24.   (Previously presented) The apparatus of claim 30, wherein the rule
matching the at least one transport level field comprises a highest priority matching rule.

25.   (Previously presented) The apparatus of claim 30, wherein the at least one
transport level field of the packet includes a source port and a destination port, and

wherein each rule of a bin includes a source port lower bound, a source port upper bound,

a destination port lower bound, and a destination port upper bound.

26.   (Original) The apparatus of claim 25, wherein the classification circuit

comprises:

a first comparison circuit to compare the source port of the received packet with the

        source port lower and upper bounds of one of the rules;

a second comparison circuit to compare the destination port of the received packet with

        the destination port lower and upper bounds of the rule; and

an output circuit to output a match signal if a rule of the corresponding bin matches the

        source and destination ports of the received packet.

27.   (Original) The apparatus of claim 26, wherein the rule matches the source

and destination ports of the received packet if:

the source port of the received packet is greater than or equal to the source port lower

        bound of the rule and less than or equal to the source port upper bound of the rule;

        and

the destination port of the received packet is greater than or equal to the destination port

        lower bound of the rule and less than or equal to the destination port upper bound

        of the rule.

28.   (Canceled)

29.   (Previously presented) The apparatus of claim 30, wherein to identify a

bin corresponding to a network path of a received packet, the processing system is

programmed to perform operations including:

identifying, from a number of entries in a data structure, an entry having a source address

      prefix matching the source address of the received packet, the matching entry

      including a first identifier;

identifying, from a number of entries in another data structure, an entry having a

      destination address prefix matching the destination address of the received packet,

      the matching entry including a second identifier; and

identifying, from the number of bins, a bin corresponding to the first and second

      identifiers and the protocol.

30.   (Previously presented) An apparatus comprising:

a memory, the memory having a plurality of bins stored therein, each bin including a

      number of rules;

a processing system, the processing system programmed to identify, from the plurality of

      bins, a bin corresponding to a network path of a received packet; and

a classification circuit coupled with the memory and the processing system, the

      classification circuit to identify, from the rules of the corresponding bin, a rule

      matching at least one transport level field of the packet, wherein to identify a bin

      corresponding to a network path of a received packet, the processing system is

      programmed to perform operations including:

searching a source address data structure to find a first index and a third index, the

first index associated with a fully specified filter having a source prefix

matching the source address of the packet, the third index associated with

a partially specified filter having a source prefix matching the source

address of the packet;

searching a destination address data structure to find a second index and a fourth

index, the second index associated with a fully specified filter having a

destination prefix matching the destination address of the packet, the

fourth index associated with a partially specified filter having a destination

prefix matching the destination address of the packet;

forming a key from the first index, the second index, and the protocol; and

searching a primary table for an entry matching the key, the primary table

including a number of entries, each entry corresponding to one of a fully

specified filter, a fully specified filter intersection, and an indicator filter;

wherein an entry of the primary table matching the key will identify the

corresponding bin.

31.   (Original) The apparatus of claim 30, wherein to identify a bin

corresponding to a network path of a received packet, the processing system is

programmed to perform operations further including:

searching a first of two secondary tables for an entry matching a key formed from the

third index and the protocol, the first secondary table including a number of

entries, each entry corresponding to a partially specified filter; and

searching a second of the two secondary tables for an entry matching a key formed from

the fourth index and the protocol, the second secondary table including a number

of entries, each entry corresponding to a partially specified filter;

wherein, if no match is found in the primary table, a matching entry in one of the two

secondary tables will identify the corresponding bin.

32.   (Original) The apparatus of claim 31, wherein, if no match is found in the

primary table or either of the secondary tables, the corresponding bin comprises a default

bin associated with an entire two-dimensional address space.

33.   (Original) The apparatus of claim 30, wherein to identify a bin

corresponding to a network path of a received packet, the processing system is

programmed to perform operations further including:

searching the source address data structure to find a fifth index associated with a wide

filter having a source prefix matching the source address of the packet;

searching the destination address data structure to find a sixth index associated with a

wide filter having a destination prefix matching the destination address of the

packet;

forming a second key from the fifth index, the sixth index, and the protocol; and

searching a wide filter table for an entry matching the second key, the wide filter table

including a number of entries, each entry corresponding to a wide filter;

wherein, if no match is found in the primary table, a matching entry the wide filter table

will identify the corresponding bin.

34.   (Original) The apparatus of claim 33, wherein each wide filter contained in the wide filter table comprises a fully specified filter having a number of indicator filters exceeding a specified threshold.

35.   (Previously presented) The apparatus of claim 30, wherein the memory, the processing system, and the classification circuit comprise a single processing device.

36.   (Canceled)

37.   (Previously presented) The system of claim 43, wherein the rule matching the at least one transport level field comprises a highest priority matching rule.

38.   (Previously presented) The system of claim 43, wherein the at least one transport level field of the packet includes a source port and a destination port, and wherein each rule of a bin includes a source port lower bound, a source port upper bound, a destination port lower bound, and a destination port upper bound.

39.   (Original) The system of claim 38, wherein the classification circuit comprises:
a first comparison circuit to compare the source port of the received packet with the
        source port lower and upper bounds of one of the rules;
a second comparison circuit to compare the destination port of the received packet with
        the destination port lower and upper bounds of the rule; and

an output circuit to output a match signal if a rule of the corresponding bin matches the

source and destination ports of the received packet.

40.   (Original) The system of claim 39, wherein the rule matches the source

and destination ports of the received packet if:

the source port of the received packet is greater than or equal to the source port lower

bound of the rule and less than or equal to the source port upper bound of the rule;

and

the destination port of the received packet is greater than or equal to the destination port

lower bound of the rule and less than or equal to the destination port upper bound

of the rule.

41.   (Canceled)

42.   (Previously presented) The system of claim 43, wherein to identify a bin

corresponding to a network path of a received packet, the processing engine is

programmed to perform operations including:

identifying, from a number of entries in a data structure, an entry having a source address

prefix matching the source address of the received packet, the matching entry

including a first identifier;

identifying, from a number of entries in another data structure, an entry having a

destination address prefix matching the destination address of the received packet,

the matching entry including a second identifier; and

identifying, from the number of bins, a bin corresponding to the first and second

identifiers and the protocol.

43.   (Previously presented) A system , comprising:

a bus;

a processing device coupled with the bus, the processing device including

a memory, the memory having a plurality of bins stored therein, each bin

including a number of rules,

a processing engine, the processing engine programmed to identify, from

the plurality of bins, a bin corresponding to a network path of a

received packet, the corresponding bin further corresponding to a

protocol associated with the received packet, and

a classification circuit coupled with the memory and the processing

engine, the classification circuit to identify, from the rules of the

corresponding bin, a rule matching at least one transport level field

of the packet; and

a network interface coupled with the bus, the network interface to couple the system with

an optical link, wherein to identify a bin corresponding to a network path of a

received packet, the processing engine is programmed to perform operations

including:

searching a source address data structure to find a first index and a third index, the

first index associated with a fully specified filter having a source prefix

matching the source address of the packet, the third index associated with

a partially specified filter having a source prefix matching the source

address of the packet;

searching a destination address data structure to find a second index and a fourth

index, the second index associated with a fully specified filter having a

destination prefix matching the destination address of the packet, the

fourth index associated with a partially specified filter having a destination

prefix matching the destination address of the packet;

forming a key from the first index, the second index, and the protocol; and

searching a primary table for an entry matching the key, the primary table

including a number of entries, each entry corresponding to one of a fully

specified filter, a fully specified filter intersection, and an indicator filter;

wherein an entry of the primary table matching the key will identify the

corresponding bin.

44.   (Original) The system of claim 43, wherein to identify a bin

corresponding to a network path of a received packet, the processing engine is

programmed to perform operations further including:

searching a first of two secondary tables for an entry matching a key formed from the

third index and the protocol, the first secondary table including a number of

entries, each entry corresponding to a partially specified filter; and

searching a second of the two secondary tables for an entry matching a key formed from

the fourth index and the protocol, the second secondary table including a number

of entries, each entry corresponding to a partially specified filter;

wherein, if no match is found in the primary table, a matching entry in one of the two

secondary tables will identify the corresponding bin.

45.   (Original) The system of claim 44, wherein, if no match is found in the

primary table or either of the secondary tables, the corresponding bin comprises a default

bin associated with an entire two-dimensional address space.

46.   (Original) The system of claim 43, wherein to identify a bin

corresponding to a network path of a received packet, the processing engine is

programmed to perform operations further including:

searching the source address data structure to find a fifth index associated with a wide

filter having a source prefix matching the source address of the packet;

searching the destination address data structure to find a sixth index associated with a

wide filter having a destination prefix matching the destination address of the

packet;

forming a second key from the fifth index, the sixth index, and the protocol; and

searching a wide filter table for an entry matching the second key, the wide filter table

including a number of entries, each entry corresponding to a wide filter;

wherein, if no match is found in the primary table, a matching entry the wide filter table

will identify the corresponding bin.

47.   (Original) The system of claim 46, wherein each wide filter contained in the wide filter table comprises a fully specified filter having a number of indicator filters exceeding a specified threshold.

48.   (Previously presented) The system of claim 43, wherein the memory comprises a static random access memory (SRAM).

49.   (Canceled)

50.   (Previously presented) The article of manufacture of claim 55, wherein the matching rule comprises a highest priority matching rule.

51.   (Previously presented) The article of manufacture of claim 55, wherein the at least one transport level field of the received packet comprises a source port and a destination port, and wherein each rule of a bin includes a source port lower bound, a source port upper bound, a destination port lower bound, and a destination port upper bound.

52.   (Original) The article of manufacture of claim 51, wherein a rule matches the at least one transport level field of the packet if:

the source port of the received packet is greater than or equal to the source port lower

    bound of the rule and less than or equal to the source port upper bound of the rule;

    and

the destination port of the received packet is greater than or equal to the destination port

lower bound of the rule and less than or equal to the destination port upper bound

of the rule.

53.   (Canceled)

54.   (Previously presented) The article of manufacture of claim 55, wherein

the computer-executable instructions, when accessed, further causes the machine, when

identifying a bin corresponding to a network path of a received packet, to:

identify, from a number of entries in a data structure, an entry having a source address

prefix matching the source address of the received packet, the matching entry

including a first identifier;

identify, from a number of entries in another data structure, an entry having a destination

address prefix matching the destination address of the received packet, the

matching entry including a second identifier; and

identify, from the number of bins, a bin corresponding to the first and second identifiers

and the protocol.

55.   (Previously presented) An article of manufacture comprising:

a computer-readable medium encoded with computer-executable instructions that, when

accessed by a machine, causes the machine, to:

identify, from a plurality of bins stored in a memory, a bin corresponding to a network

path of a received packet, and further corresponding to a protocol associated with

the received packet, each of the bins including a number of rules;

issue a command to a classification circuit, the command identifying the corresponding

bin;

copy the rules of the corresponding bin from the memory to the classification circuit,

wherein the classification circuit compares at least one transport level field of the

received packet with each of the rules and provides a match signal if a rule

matches the at least one transport level field of the packet;

in response to the match signal, apply an action associated with the matching rule to the

received packet; and when identifying a bin corresponding to a network path of a

received packet, to:

search a source address data structure to find a first index and a third index, the

first index associated with a fully specified filter having a source prefix

matching the source address of the packet, the third index associated with

a partially specified filter having a source prefix matching the source

address of the packet;

search a destination address data structure to find a second index and a fourth

index, the second index associated with a fully specified filter having a

destination prefix matching the destination address of the packet, the

fourth index associated with a partially specified filter having a destination

prefix matching the destination address of the packet;

form a key from the first index, the second index, and the protocol; and

search a primary table for an entry matching the key, the primary table including a

number of entries, each entry corresponding to one of a fully specified

filter, a fully specified filter intersection, and an indicator filter;

wherein an entry of the primary table matching the key will identify the

corresponding bin.

56.   (Previously presented) The article of manufacture of claim 55, wherein

the computer-executable instructions, when accessed, further causes the machine to:

search a first of two secondary tables for an entry matching a key formed from the third

index and the protocol, the first secondary table including a number of entries,

each entry corresponding to a partially specified filter; and

search a second of the two secondary tables for an entry matching a key formed from the

fourth index and the protocol, the second secondary table including a number of

entries, each entry corresponding to a partially specified filter;

wherein, if no match is found in the primary table, a matching entry in one of the two

secondary tables will identify the corresponding bin.

57.   (Original) The article of manufacture of claim 56, wherein, if no match is

found in the primary table or either of the secondary tables, the corresponding bin

comprises a default bin associated with an entire two-dimensional address space.

58.   (Previously presented) The article of manufacture of claim 55, wherein

the computer-executable instructions, when accessed, further causes the machine to:

search the source address data structure to find a fifth index associated with a wide filter

having a source prefix matching the source address of the packet;

search the destination address data structure to find a sixth index associated with a wide

filter having a destination prefix matching the destination address of the packet;

form a second key from the fifth index, the sixth index, and the protocol; and

search a wide filter table for an entry matching the second key, the wide filter table

including a number of entries, each entry corresponding to a wide filter;

wherein, if no match is found in the primary table, a matching entry the wide filter table

will identify the corresponding bin.

59.   (Original) The article of manufacture of claim 58, wherein each wide

filter contained in the wide filter table comprises a fully specified filter having a number

of indicator filters exceeding a specified threshold.